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Sensitivity Analysis

Financial Tracking/Analysis Tool

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Introduction

Effectively organizing the continuously evolving idea of financial management requires a thorough analysis of variables and their impact on outcomes — driving confident decision-making. Sensitivity analysis is an invaluable tool, providing insight into how a financial tool responds to important changing factors. It is not just about displaying how strong and adaptable the tool is, but also its vulnerabilities. In this report, I will be talking about the strengths and weaknesses of my functionalities, the effect of different factors affecting the financial plan, and how well my tool works against them. The goal of the analysis is to demonstrate the project's significance, depict how it responds to certain changes, and how it can adapt to these changes.

Project Explanation

My financial planning tool is a comprehensive Excel-based solution to real-world financial management issues incorporating VBA, formulas, and user-friendly interfaces. Consisting of the key components highlighted in the later paragraphs, its simplicity, and effective features align with the project's requirements. As a personal finance tool, it includes everything essential for effective financial planning for any student, going above and beyond.

User Data Entry

As the first worksheet, it acts as a hub for all Expenses and Incomes from the user, no matter the date. Through a UserForm, the user can input a date, item name, category (Bills, Shopping, Entertainment, or Other), monetary value, and item description if need be. The inclusion of all of this information is crucial, as the user can easily track a specific Expense they are looking for, and it allows for easier output in future sheets. Furthermore, the columns with monetary values are sorted with Conditional Formatting, clearly indicating to the user their Standout Expenses in red, allowing them to learn and adapt accordingly. Finally, this sheet includes a Clear Button as well. Say, for example, the user is beginning a new calendar year. This is an easy way of resetting all of these mixed entries in the table.

Weaknesses:
- ➔ The only way to fix a misentry is to clear to whole table (all data will be lost)
  - ◆ This can be fixed with a clear latest row functionality or macro

Personal Goals

Here, the user can input limits to spending for each category. Later in my tool, I analyze total spending for each category so this is a great way to compare goals with data. I also have a goals section for minimum savings per month and general non-numerical goals. Furthermore, these goals are all optional in the UserForm so it is just left "N/A" if a user doesn't have a goal in mind for a specific category. This variety of goals and optional features are all tailored to the diverse needs of any user.

Weaknesses:
- ➔ Doesn't offer a guideline or split as to how much is a "good" limit for each category (user can be lost when presented with all this specific goal information)

◆ With some research, I can offer the user with some average monthly spending guidelines
➔ Could have incorporated percentages instead, because the user may not be able to think of a number on the spot
◆ *Example:* the famous 50/30/20 split
➔ Somehow could incorporate the more general non-numerical goals into my analysis and provide more user-specific Financial Advice
➔ Could have specified that these Goals are per Month

Data Output

The output sheet has its own UserForm, asking the user to select a specific month to analyze. Once selected, it goes through all the input data from the First sheet and outputs the data only from that month into the new sheet. This data is further analyzed as this sheet also separates all the entries by categories, gives a total, and even compares with the goal limits from the previous sheet. There is also a cell that displays total savings for the month in the top right corner. All totals are highlighted yellow, met goals are highlighted green, and unmet goals are highlighted red, all for a great user experience. This all provides a thorough, quick, and simple analysis of the chosen month in one step. A clear button is also provided, say a User wants to analyze a different month.

Weaknesses:
➔ If the user has entries from multiple different years, my sheet will output entries from all months as one, as long as they have the same name (I only analyze data for one calendar year)

Financial Advice

On this sheet, 2 graphs are shown displaying the results of the data from the previous step: Spending by Category, and Income vs. Expenses. Both provide a clear visualization of top-spending categories, as well as how much money is saved per month. To support this Quantitative data, a button for advice was created for Qualitative data. Once pressed, a series of MsgBox are shown with personalized advice for the user. These include a nice introduction, top spending category, whether or not goal limits are met, and savings percentage, as well as day-to-day tips for each. This encapsulates all the collected data from my project, and the user's needs, all in an easy-to-read advice format.

Weaknesses:
➔ Graphs could be more visually appealing (was difficult as entire thing was coded and generated)
➔ A variety of more graphs could be included, like a thermometer chart showing progress to goals
➔ Advice could have considered the more general non-numerical goals the user entered at the start

Calculator

The last sheet acts as an additional feature, just in case the user would like to make number calculations for anything. With 2 inputted numbers, you can operate Addition, Subtraction, Multiplication, or Division. This is useful when calculating total groceries on a trip, taxes on certain things, etc. Overall, this is a great aspect to have in a diverse tool.

Weaknesses:
➜ Could involve more financial-specific calculations, like interest rates, loans, etc.

Factors Affecting Financial Plans

As time passes, I will undergo personal development and so will my financial requirements and goals. With this, the efficiency and results of my financial tool will be affected. Changes in income, unexpected expenses, or alterations in spending patterns can directly influence financial plans. Even external economic factors like inflation rates or changes in job markets can influence the ability to meet certain financial goals. For example, a sudden increase in tuition fees or a reduction in income during a semester break can impact budgeting. Expanding on that idea, as I get older, new categories in my budget such as mortgages or startup expenses will be introduced. Consequently, this will require the need for additional visualizations like monthly breakdowns over time. Therefore, the absence of features allowing for these new categories may conflict with my needs.

Evolving personal goals, such as saving for a specific item or planning for an unforeseen event, can alter financial priorities as well. A user's changing aspirations or financial objectives may require adjustments to the overall financial plan. Personal goals may change as individuals experience life events, reassess priorities, or encounter unforeseen circumstances. For example, a user may initially plan to save for a specific gadget but might later shift their focus to building an emergency fund.

While certain aspects of the tool's effectiveness are influenced by these factors, I anticipate using the tool exclusively for personal purposes. As a result, I have the knowledge to determine which entries maintain the system's correct functionality and can modify the code to accommodate additional functionalities when needed.

Effects on User and Possible Improvements

Users can be left confused, especially when dealing with financial data. Handling minor errors like entering an incorrect date or value (including negative entries where inappropriate) is challenging, as the project restricts direct interaction with spreadsheet cells. With this, users might even unintentionally overlook critical details, such as incorrectly including or omitting a negative sign when inputting monetary values. This seemingly minor error could have substantial consequences, messing up the accuracy of financial results and potentially impacting the quality of financial advice generated by the tool. Therefore, addressing these limitations and introducing features that enhance flexibility and precision is crucial for improving the tool's usability and reliability over time. My tool accounts for this with a Clear All option, however, the addition of a Clear Last Row functionality would have been even better. Or, implementing a macro that empowers users to selectively delete specific cells enhances ease of access and expedites the correction process.

Limitations to the tool, especially due to the lack of expandable features, may cause user engagement over time. As users become adults, they may be introduced to distinct items that don't necessarily fit into the existing categories of the tool. Ultimately, this will cause confusion and misclassification of items. However, if a macro was created that seamlessly adds new categories, it would be a viable solution. To

further tackle the challenge of categorization, an approach incorporating macros that automatically classify certain sub-categories as assets or liabilities could be effective. This strategic categorization enables monetary values to be automatically designated as positive or negative, which is essential when dealing with things like mortgages. Although my VBA skills are limited at the moment, this innovative thinking is what will make this tool adaptable over time.

As a student, I will also have purchases that do not necessarily represent a month, but several months. For example, when I pay all my tuition at once, that entry is registered for 1 month only. In reality, that payment represents expenses over a term (4 months). To account for these aspects, I could add additional entries into my UserForm, asking for the lengths of bills for example, and splitting them into months correctly. This way, data is represented correctly and certain months are not unreasonably more expensive than others. Building on this idea, it would be even better if my tool analyzed multiple months at once. Although it is great that I can focus on one month and extrapolate specific data related to goals, progression over months could be a better way of visualizing this to users. Currently, users have to manually select different months, leaving them to analyze which is not what we want.

Extending on this idea of adaptability and user progression, the incorporation of new chart types is also crucial. Thermometer charts are a phenomenal way of showing the user how close they are to achieving their goals. Also, line graphs could be created to demonstrate patterns over several months to the user. As my proficiency in VBA advances, custom macros can be designed to seamlessly integrate additional chart types, enabling users to represent their data more comprehensively and effectively.

Conclusion

In summary, the sensitivity analysis conducted on the financial management tool shows the significance of adaptability to meet the changing needs and financial scenarios of users. The analysis demonstrates the challenges posed by the tool's limitations, which could potentially decrease user engagement over time. Recognizing factors like the introduction of new categories and visualizations emphasizes the necessity for a dynamic tool capable of evolving with shifting financial landscapes. To address these changes, the strategic incorporation of macros as a solution provides flexibility for the seamless integration of new categories and chart types. While currently constrained by my limited proficiency in Excel VBA, this innovative approach shows the possibility of continuous tool evolution as my skills advance. Additionally, correcting inaccuracies resulting from incorrect inputs becomes crucial, and the proposed refinement of VBA scripts and macros stands as a proactive measure to enhance precision and user experience. In conclusion, the sensitivity analysis not only underscores potential challenges but also charts a course for refining and expanding the financial management tool, ensuring its resilience and effectiveness in the dynamic realm of personal finance.